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VIA E-FILING

Carlsbad Energy Center Project (07-AFC-06C)
Karen Douglas, Commissioner and Presiding Member
Andrew McAllister, Commissioner and Associate Member
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814-5512

Re: **Carlsbad Energy Center Project, 07-AFC-06C**
Information Regarding Recycled Water Supply, Processing and Treatment Waste Streams

Dear Committee Members:

At the January 7, 2014 CECP Siting Committee Status Conference, the Committee requested additional information about the nature of use and processing for the trailer-mounted demineralizer beds that will be used by the Amended CECP to treat recycled water sufficient to allow its use as process water for the facility. The following information is responsive to that request. This request was discussed further at the Preliminary Site Assessment Work Shop.

The recycled water to be supplied to the CECP facility will be disinfected, tertiary-treated (Title 22 non-hazardous) provided by the City of Carlsbad from the Encina Water Authority (EWA) facility which performs the conventional tertiary treatment methods. Conventional treatment consists of a sedimentation unit process between the coagulation and filtration processes and will produce an effluent that meets the definition for disinfected tertiary recycled water. Tertiary recycled water is approved for use in various applications including landscaping irrigation, industrial process water that may come in contact with workers, and structural fire suppression. The water will be delivered into the 500,000 gallon CECP Raw Water Tank.

Recycled water to be used for plant processes will be removed from the CECP Raw Water Tank and passed through a series of cation, anion, and mixed bed demineralizers. The demineralizer vessels will be trailer-mounted and connected with piping and hoses. The trailer-mounted mixed bed demineralizers are provided in a semi-trailer and are completely self-contained units. The trailer will be delivered to the site by a semi-truck and dropped at the water treatment area for as long as needed. Mixed bed resins consist of positively and negatively charged resin (plastic) beads with strong positive or negative charges that draw minerals and salts in solution from the water as it passes through the vessels. The mixed bed resin vessels are typically designed by the vendor providing the vessels specifically to treat the water chemistry of the application. In this case, the resins will be designed to remove total dissolved solids in the form of salts. The salts typically consist of chlorides and sulfates.

As the resin beds within a trailer are exhausted by the precipitation of salts and minerals on the resin beads, the trailer will be disconnected and the trailer taken off-site to the trailer's lessors' facility for regeneration. The resin vessels are drained of water prior to transportation. The resulting material in the resin beds will be considered non-hazardous recyclable solid waste and will be transported off site via a bill-of-lading. The trailers will transported to a regional State-licensed treatment facility where the resin beds will be regenerated.

The regeneration process consists of passing caustic and acidic solutions through the resin beds to convert the precipitated salts back into solution. At the regeneration facility the resin beads will be transferred to external regeneration vessels for regeneration, which includes air scrub, backwash, chemical introduction, deionized water rinse, and reloading into the mobile units to ready for transport and reuse.

Resins are thoroughly backwashed and air scrubbed until the backwash effluent is relatively free of suspended material indicating that this procedure has removed surface contaminants. Up to six individual air scrub and backwash steps may be used during this step over a six hour time period. Regeneration of cation resins typically uses hydrochloric acid solution applied at 4 to 6 percent strength. Regeneration of anion resin typically uses sodium hydroxide applied at 3 to 5 percent strength at controlled temperatures up to 120°F (49°C). All final rinse waters are deionized and analyzed for purity to ensure that salts and impurity have been removed from the beads. The resins are then moved back into the vessels. The vessels are tested for quality control and then issued back into service.

The regeneration facility processes the caustic and acidic solutions by elementary neutralization. The waste discharged from the regeneration facility is an industrial waste liquid and is typically discharged under an industrial waste permit to a municipal wastewater authority. The regional regeneration facility can be a Certified Unified Program Agency (CUPA) permitted facility.

A regional regeneration facility for GE supplied mobile demineralization units is located in Fontana, California. A regional generation facility for resins supplied by Evoqua Water Technology (formerly Siemens Water) is located in Los Angeles, California.

I hope this information addresses your questions regarding the source, management and regeneration methods of the demineralizer beds. If you have any questions, please contact me at 916-930-2527.

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